# Medical Progress\*\*\* Technology

Volume 7, 1980

Editor-in-Chief:

H. Hutten, Mainz

Editors:

A. M. Albisser, Toronto · K. Atsumi, Tokyo
M. Bracale, Naples · U. Faust, Stuttgart
S. E. Harrison, Philadelphia · J. Henderson, Auckland
D. W. Hill, London · J. A. Hopps, Ottawa
P. Lotz, Ulm · R. Magnusson, Göteborg
M. Oshima, Tokyo · C. D. Ray, Minneapolis

M. Schaldach, Erlangen · J. Torresani, Marseille
 M. E. Valentinuzzi, San Miguel de Tucumán

R. P. van Wijk van Brievingh, Delft

S. Yerushalmi, Rehovot · C. Yoshimoto, Sapporo



Springer International

## **Medical Progress through Technology**

Medical Progress through Technology is one of the major clinically oriented journals in biomedical engineering. The journal covers recent developments in medical technology, clinical engineering, and bio-engineering which apply to the solutions of problems in clinical medicine and health care.

Medical Progress through Technology serves physicians and biomedical engineers who are concerned with the effective application of modern engineering and systems methodology in their respective specialties by publishing:

Reports on recent activities and developments in Emergency Life Support Technics

Perinatology
Radiology and Nuclear Medicine
Diagnostic Laboratories
Assist Devices

Reports and reviews of advance engineering principles and technologies, especially prepared for our readers on:
Noninvasive Diagnostic Methods (Ultrasound, etc.)

Noninvasive Diagnostic Methods (Ultrasou Transducers Pattern Recognition Computer Technics, Terminals, etc.

Computer Technics, Terminals, etc. Materials

Special reports on

Evaluations of Methods and Instruments Safety Aspects and Standards Economic Aspects Planning

Technical notes of academic and industrial origin on

New Methods Instrumentation Systems Improved Teaching Methods Related to Health Care Problems

Reports on significant meetings and bibliographic information on relevant literature in medicine and engineering.

The former policy of Medical Progress through Technology was to devote each issue to a single topic. Now, all forthcoming issues will each cover several subject areas of current interest. As a result, the reader will have more immediate access to important interdisciplinary information in his special field of interest.

Springer-Verlag KG, Heidelberger Platz 3, D-1000 Berlin 33, Telephone (030) 8207-1, Telex 01-83319

Springer-Verlag KG, Journal Production Department I, Postfach 105 280, D-6900 Heidelberg 1, Telephone (06 221) 487-1, Telex 04-61 690

Springer-Verlag New York Inc., 175 Fifth Avenue, New York, NY 10010, USA, Telephone (212) 477-8200, Telex 0023 232 235

### Subscription Information

Volume 7 (4 issues) will appear in 1980.

Changes of address: Allow six weeks for all changes to become effective. All communications should include both old and new addresses (with zip codes) and should be accompanied by a mailing label from a recent issue.

North America. Subscription rate: US \$87.40, including postage and handling. Subscriptions are entered with prepayment only. Orders should be addressed to: Springer-Verlag New York Inc., Service Center Secaucus, 44 Hartz Way, Secaucus, NJ 07094, USA, Telephone (201) 348-4033, Telex 0023125 994.

All Other Countries. Subscription rate: DM 148.00, plus postage and handling. Orders can either be placed with your bookdealer or sent directly to: Springer-Verlag, Heidelberger Platz 3, D-1000 Berlin 33, Telephone (030) 8207-1, Telex 01-83 319.

#### Copyright

It is a fundamental condition that submitted manuscripts have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature, and translations.

Photographic reproduction, microform, or any other reproduction of text, figures, or tables from this journal is prohibited without permission obtained from the publisher.

Special Regulations for the USA

The Article Fee Code on the first page of an article in this journal indicates the copyright owner's consent that in the USA copies may be made for personal or internal use, provided the stated fee for copyring beyond that permitted by Section 107 or 108 of the United States Copyright Law is paid through the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA.

If a code does not appear, copies of the article may be made without charge, provided permission is obtained from the publisher.

The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.

The use of general descriptive names, trade names, trade marks, etc., in this publication, even if the former are not specifically identified, is not to be taken as a sign that such names are exempt from the relevant protective laws and regulations and may accordingly be used freely by anyone.

Authors of this journal can benefit from library and photocopy fees collected by VG WORT if certain conditions are met. If an author lives in the Federal Republic of Germany or in West Berlin, it is recommended that he contact Verwertungsgesellschaft WORT, Abteilung Wissenschaft, Goethesträsse 49, D-8000 München 2, for detailed information.

Correspondence concerning advertisements should be sent to the Advertising Department of Springer-Verlag in Berlin:

Kurfürstendamm 237, D-1000 Berlin 15 Telephone (0 30) 882 1031, Telex 01-85 411.

## **Contents**

Bekkering, D. H.: Biomedical Engineering: Looking Back over Twenty Years 69

Book Reviews 57, 203

Charlier, J. R.: A New Instrument for Automatic Subjective and Objective Perimetry 125

Demling, L., Fruehmorgen, P., Riemann, J. F., Roesch, W.: New Methods in Gastroenterology 145

Denys, B. G., Aubert, A. E., Denef, B., Werf, F. Van de, Degeest, H., Kesteloot, H.: Relationship Between Wall Stress and the Apexcardiogram 111

Dufau, E., Acker, H., Sylvester, D.: Double-Barrel Ion-Sensitive Microelectrodes with Extra Thin Tip Diameters for Intracellular Measurements 35

Durie, N. D., Farley, R. L.: A Simple Controller with Speed Sensing for Wheelchairs 199

Greatbatch, W.: Physiological Stimulators and Their Power Sources 81

Hutten, H.: Editor's Note 1

Katzir, E.: XII International Conference on Medical and Biological Engineering and V International Conference on Medical Physics 59

Klein, J. C., Slama, G.: A Sophisticated Programmable Miniaturised Pump for Insulin Delivery 193

Korn, U., Rav-Noy, Z., Shtrikman, S., Zafrir, M.: Thermoelectric Needle Probe for Temperature Measurements in Biological Materials 41

Koster, W. G., Kuypers, M. H.: Intracranial Pressure and Its Epidural Measurement 21

Kralj, A., Bajd, T., Turk, R.: Electrical Stimulation Providing Functional Use of Paraplegic Patient Muscles 3 Kratochwil, A.: Ultrasonic Diagnosis in Obstetrics and Gynecology 157

Levin, M., Kuikka, J., Bassingthwaighte, J. B.: Sensitivity Analysis in Optimization of Time-Distributed Parameters for a Coronary Circulation Model 119

Mallard, J.: Nuclear Imaging 87

Schindler, J. G., Maier, H., Heidland, A., Jaros, G. G., Aziz, O., Steffen, Ch.: Continuous and Discontinuous Ionography of the Pancreatic Juice and the Parotid Saliva Using Carrier-Membrane Disc-Electrodes 29

Schultz, E., Felix, R.: Fan-Beam Computerized Tomography Systems with Rotating and with Stationary Detector Arrays ('Third' and 'Fourth' Generation) 169

Schwan, H. P.: Biomedical Engineering and Basic Research: Historical Perspectives 63

Spencer, W. J., Corbett, W. T., Schade, D. S., Eaton, R. P., Shafer, B. D.: Modified Hospital Pumps for Pulsed Insulin Delivery 45

Strax, P.: An Overview of Breast Cancer: Defining the Problem 131

Tiran, J., Broekhuyse, H., Albisser, A. M.: Glucose and Insulin Dynamics in the Anaesthetized Dog: A Mathematical Modeling Study 183

Weidlich, E., Richter, G. J., Mund, K., Sturm, F. v., David, E., Brandt, G.: Threshold Measurements Using Stimulating Electrodes of Different Materials in the Skeletal Muscles of Cats 11

Youdin, M., Sell, G. H., Reich, T., Clagnaz, M., Louie, H., Kolwicz, R.: A Voice Controlled Powered Wheelchair and Environmental Control System for the Severely Disabled 139